

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### NO DRAWINGS

### Bone Implants and Drills and Taps for Bone Surgery

1, SAMI SANDHAUS, an Israeli citizen of 24  
Chemin de la Vallonette, Lausanne, Switzer-  
land, do hereby declare the invention for  
which I pray that a patent may be granted  
5 to me and the method by which it is to be  
performed, to be particularly described in  
and by the following statement:—

The present invention relates to bone im-  
plants or inserts, and tools for bone sur-  
10 gery.

Up to the present, materials employed for  
implants in bone surgery are metals such as  
gold, silver or steel, and synthetic organic  
materials. These materials present disadvan-  
15 tages. The metals may dissolve, slowly or  
rapidly, under the action of the liquids pre-  
sent in the body. It is, in particular, known  
that metallic implants in bone employed in  
dentistry may dissolve under the combined  
20 action of saliva and blood acting simultane-  
ously, these two liquids often having dif-  
ferent pH which may give rise to corrosive  
electric currents. Furthermore, implants  
constituted by synthetic organic materials,  
25 such as nylon for example, may also be at-  
tacked by the liquids of the body. Often,  
these organic materials may also release in-  
to the body harmful substances, for example  
softening agents.

30 The present invention has for its object  
to avoid these disadvantages, by creating  
bone implants and tools for bone surgery  
not presenting the above mentioned disad-  
vantages of metals and synthetic organic ma-  
35 terials. According to the invention bone im-  
plants and drills and taps for bone surgery  
consist of oxide-ceramic material. Such  
material is tolerable biologically and phys-  
iologically, compatible with its biological  
40 surroundings, non-conductive of electricity,  
and has mechanical qualities necessary for  
its use.

An implant into a bone may be made by  
[Pri

drilling a hole into the bone by means of a  
drill, treating said hole with a screw tap, 45  
and inserting a screw-shaped implant in said  
hole; said drill, tap and implant each consist-  
ing of oxide-ceramic material.

The oxide-ceramic material is such as is  
employed as cutting ceramics for machining 50  
steel. It exists on the market in particular  
under the trade mark "Degussit" (manufac-  
tured by the Degussa firm in Germany). A  
typical example of "Degussit" is constituted  
by aluminium oxide ( $Al_2O_3$ ) of a pureness 55  
of at least 99.5% with traces of chromium  
oxide ( $Cr_2O_3$ ), calcined and solidified at  
about 1900°C. This calcined material is  
composed of very small crystallites of  
— $Al_2O_3$  intimately co-mingled. It presents 60  
the following properties: specific weight  
3.7 — 4 g/cm<sup>3</sup>; hardness to the Mohs scale  
9; resistance to pressure 300 kg/mm<sup>2</sup>; resis-  
tance to bending 50 kg/mm<sup>2</sup>.

Other examples of "Degussit" are con- 65  
stituted by aluminium oxide calcined at  
high temperatures (1000-1900°C) in the pre-  
sence of small quantities of binding agents  
such as Mo, TiC, Mo<sub>2</sub>C, SiO<sub>2</sub>, MgO. More-  
over, one may also employ "Degussit" mat- 70  
erials constituted by the BeO, MgO or ZrO<sub>2</sub>  
oxides calcined at a high temperature.

The oxide-ceramic material according to  
the present invention can be used for all  
kinds of implants in bone surgery, but it is 75  
especially advantageous for implants for the  
jaw bones. Such implants, after insertion,  
are used to fix thereon artificial teeth. The  
insertion of the implants into the bones, es-  
pecially into the jaw bones, is made by drill- 80  
ing a hole into the bone, treating this hole  
with a screw tap, and inserting a screw-  
shaped implant into the hole, the drill and  
tap used, as well as the implant consisting  
of said oxide-ceramic material, and especi- 85  
ally one of the above-mentioned "Degussit"

materials.

WHAT I CLAIM IS:—

1. Bone implants and drills and taps for bone surgery, consisting of oxide-ceramic material.
2. Bone implants and drills and taps for bone surgery, according to claim 1, consisting of aluminium oxide of a purity of at least 99.5% with traces of trivalent chrom-

ium oxide, said aluminium oxide having 10 been fired and solidified at about 1900°C.

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